

# **The Correlates of Cognitive Ageing and Adoption of Anti-Ageing Products Among Older Adults**

By:

**Fon Sim Ong, Yap-Ying Lu  
and  
David R. Phillips**

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# THE CORRELATES OF COGNITIVE AGEING AND ADOPTION OF ANTI-AGEING PRODUCTS AMONG OLDER ADULTS

Fon Sim Ong  
Yap-Ying Lu  
Faculty of Business and Accountancy  
University of Malaya  
Malaysia

and  
David R. Phillips  
Asia-Pacific Institute of Ageing Studies  
Lingnan University  
Hong Kong

## ABSTRACT

Chronological age and cognitive age had a positive and significant relationship. The findings were consistent with past research suggesting that most people view themselves to be several years younger. As antecedents, biological changes and transitional life events showed a significant positive relationship with cognitive age. The relationship between cognitive age and defensive ageing consumption activities was examined.

## INTRODUCTION

The growing silver market segment in Malaysia has attracted the interest of researchers and marketers, albeit limited in numbers and scale. They are beginning to look for answers to the questions of what, how and why older consumers buy. With increase life expectancy, older Malaysians are looking into ways to add quality to the added years by searching for products that will help them live and look better. In line with this aspiration, there is significant interest in defensive ageing consumption activities, including anti-ageing products and exercises. This interest is evident from the prolific increase in the varieties and range of products and services such as multi-vitamins and health



supplements, anti-ageing treatments and therapies, skin care, and Botox treatments, all aiming for a more youthful look and a healthier body.

While research into older consumers has spanned several decades beginning in the 1960s in US, research of this nature is relatively new in Malaysia. Past studies that focus on older consumers include shopping habits and retail needs of retirees in Malaysia (Ong and Chua, 2006). Ong and Phillips (2007) studied the expenditure pattern of older adults and factors important to older adults for making purchase decisions on four categories of products: groceries, apparel, pharmaceutical products and eating-outlets. Ong and Md Nor (2007) examined the direct and indirect effects of life events on consumer behaviour. These past studies provide insight into the behaviour of older people as consumers. However, it is equally important to understand how their behaviour is being influenced by their cognition and their self-concept.

## OBJECTIVES

Based on the suggestion of Mathur and Moschis (2005) that future research in cognitive age should assess the impact of similar types of antecedent variables derived from the theoretical framework of their study, this paper replicates the study of Mathur and Moschis. It follows the suggestion of Mathur and Moschis by examining the effects of cognitive age using the same antecedent variables and testing the relationships in an Asian context. However, the consequences of cognitive age in Mathur and Moschis were not replicated. Instead, the present research extends previous research by examining the influence of cognitive age on defensive consumption behaviour: (a) the adoption of anti-

ageing products and exercise, and (b) the relationship between adoption of defensive ageing and life satisfaction.

## BACKGROUND

Cognitive age has been an important construct in studies of older consumers (Mathur and Moschis, 2005). The concept of cognitive age is deeply rooted in theory and research on self concept (Mathur and Moschis, 2005). Self-concept can be viewed in cognitive terms and behavioural terms, although the two may have a close relationship. Self-concept can be stable over one's live span; however, age identity is an important element of one's self-concept that may or may not change with age (Mathur and Moschis, 2005). It could change if an individual's environment changes or the person's behaviour changes within the environment (Crain and Bracken, 1994). Applying this to the concept of cognitive age, whereas chronological age changes at a steady rate, cognitive age may or may not change uniformly because individual's environments do not change as much (Mathur and Moschis, 2005). This may be the reason why some people consider themselves to be younger than their chronological age (Peters, 1971; Underhill and Cadwell, 1983).

Wilkes (1992) examined the antecedents and consequences of cognitive age: age, gender, income and employment, as the antecedents of cognitive age. The study found high  $R^2$  for demographic variables (income, chronological age, and marital status) but recommended that "other predictor variables need to be identified and tested" (Wilkes, 1992, p.299). Henderson, Goldsmith and Flynn (1995) also examined the relationship between cognitive age and demographic variables but did not find any significant relationships. Logan, Ward, and Spitze (1992) examined the relationship between of life status



variables and cognitive age and reported significant relationship between chronological age and cognitive age. In view of gaps in previous studies and the suggestions for future research, Mathur and Moschis (2005) replicated and extended the study of Wilkes by identifying and incorporating theory-based antecedents of cognitive age. They examined life events as one of the antecedents of cognitive age and found significant relationships between several life events and the person's cognitive age. Another antecedent of cognitive age is biological ageing which is related to the changes in cells and tissues resulting in the physical deterioration of the biological system (Mathur and Moschis, 2005). It is measured by the level of health and functional ability to perform activities of daily living.

## HYPOTHESES

Previous research has found chronological age to be the most important predictor of cognitive age (e.g., Barak and Stern, 1986; Wilkes, 1992; Henderson, Goldsmith and Flynn, 1995). Being of a specific age does not necessarily mean that one has to feel that old, yet being old has an important role to play in one's feeling old. Chronological age reflects not solely the passage of time, the underlying basis of the perception of age, but also has a context that can significantly influence such perceptions (Mathur and Moschis, 2005). According to Mathur and Moschis, a few specific birthdays represent signposts in one's life and are significant life-event markers by themselves (e.g. seventeenth birthday, twenty-first birthday, fifty-fifth birthday, etc) because they define eligibility for certain privileges and benefits (e.g. voting right, retirees, senior discounts etc). Such



chronological markers make people aware that they have joined an age-based subculture because marketers and non-profit organization or profit organization promote their situation (e.g. eligibility for age-based benefits and memberships), contributing to their group or status consciousness (Karp, 1988).

**H1:** *Chronological age is positively related to one's cognitive age.*

Since functional ability is to a great extent determined by biological ageing, measured by the level of health and functional performance of the main bodily systems (Dean, 1988), therefore any internal or external changes in one's body and the onset of disease or functional disability provide messages that influence one's age related self-concept because they reflect a gradual "slowing down" (Karp, 1988). For instance, experiencing a serious life-threatening illness can often make people aware of their own mortality, and an event associated with biological change can trigger one's thoughts or feelings about their own age and mortality (Karp, 1988).

**H2:** *The number of biological changes experienced by an individual is positively related to his or her cognitive age.*

Social ageing refers to a changing composite of social lifestyles, attributes, and attitudes related to various social roles people are expected to play at various stages in their lives such as "father", "retiree", and "grandparent" (Atchley, 1987; Riley, Fonner, Hess, and Toby, 1969). Roles that people may enact at different stages in life are determined to a large extent by age-related events in connection with specific roles, such as entry into workforce, marriage, and birth of first child or grandchild (Mathur and Moschis, 2005).



Many events are linked to the life cycle and are known as transitional events because they involve experiences in moving between roles (Pearlin, 1982). Adjustments to the change in one's role will require adaptation to new life conditions. Because the experience of such age-graded transition events requires adjustments in self-identity to fit age-related roles, it is expected that such events will also affect the individual's cognitive age (Mathur and Moschis, 2005).

**H3:** *The larger the number of transitional events experienced, the older the cognitive age.*

It has been recognized that two self-concept motives drive behaviour - self-esteem and self-consistency (Hattie, 2003). According to Rosenberg (1979) the power and motive for self-consistency may drive individuals toward behaviours that either enhance their self-image, building self esteem in the process, or reinforce and maintain the self concept, resulting in a stable, consistent view of the self over time. Thus, people who are entering the older age groups may try to hold on to consumption activities that they engage in while young. However, with age, some may move into a perceived degraded age status, engaging in fewer defensive-aging consumption activities (Mathur and Moschis, 2005). Wilkes (1992) found that for older women (aged 60-79) cognitive age was negatively associated with fashion interest, entertainment, and cultural activities. These findings are consistent with two ageing perspective (Mathur and Moschis, 2005). The first perspective supports the self-consistency motive, which implies a tendency to act in line with one's self-concept. The second perspective on ageing posits the inverse relationship between cognitive age and the three variables (fashion interest, entertainment and cultural



activities) suggesting a possible decline of the person's self-concept in line with social breakdown theory (Passuth and Bengston, 1988). A declining self-concept and possibly social withdrawal further suggest a declining pattern of defensive-ageing consumption activities (Passuth and Bengston, 1988; Mathur and Moschis, 2005). Thus, the ageing person tends to engage in fewer other similar defensive activities including what physicians refer to as "age management" while many people call it "defensive ageing".

**H4a:** *There is a negative relationship between cognitive age and patronage of anti-ageing products.*

**H4b:** *There is a negative relationship between chronological age and patronage of anti-ageing products.*

**H4c:** *As one's cognitive age increases; he/she is less likely to participate in sports and exercising.*

**H4d:** *As one's chronological age increases; he/she is less likely to participate in sports and exercising.*

Valois, Zullig, Huebner and Drane (2004) suggests that participation in physical activity (exercise) was associated with decreased anxiety and depression, increased self-esteem, and decreased anger and psychological stress and lower levels of mental health problems. Piko and Keresztes (2006) revealed that physical activity and life satisfaction has a positive relationship, i.e., the more active the person is in exercising, the better the self-perceived health and fitness, lower level of depressive symptoms and higher level of life satisfaction.



In this study we also explored the relationship between consumption of anti-ageing products and life satisfaction. Based on the study by Valois, Zullig, Huebner and Drane (2004) and Piko and Keresztes (2006) we argue that the relationship between adoption of anti-ageing products and life satisfaction will be positive since adoption of these products will lead to maintenance of one's self-concept and enhance one's self-concept.

**H5:** *The more individuals engage in defensive ageing activities, the more satisfied they are with life.*

It is believed that unequal distributions of coping resource (specifically, social support, high self-esteem, and perceived control over life) by social status account for demographic differences in vulnerability to the influence of transitional life events. In this study, we test for moderating effect of SES by using education since education is an important indicator of SES in Malaysia and it is a better explanatory variable compared to other SES measures such as occupation. Research evidence suggest that educated people are better able to acquire information and use it for decision-making (e.g. Baltes and Labouvie, 1973; Gaeth and Heath, 1987). We expect people with higher educational background to have the knowledge, ability and motivation to stay active and to engage in activities to prevent ageing, including adoption of anti-ageing products and exercise.

**H6:** *Older adults who have higher education are more likely to (i) adopt anti-ageing products and (ii) to exercise compared to those with lower education.*

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Insert Figure 1 about here

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## METHOD

### Samples

Data for the study were collected using convenience sampling. Students enrolled in the MBA programme of a university in Kuala Lumpur, Malaysia were asked to take survey questionnaires home and have them completed by their family member (one member is allowed per family) and their friends or colleagues at their work place who were at least 40 years old. In order to test the hypothesized relationships in this study, the age limit of 40 years or older was adopted because (i) older people tend to perceive themselves to be younger in relation to their chronological age compared with younger age groups (Underhill and Cadwell, 1983; Mathur and Moschis, 2005) and (ii) it is well established that older people are more likely to experience transitional events (used in this study as one of the antecedent variable for cognitive age) as compared to younger people.

A total of 240 sets of questionnaires were distributed and 214 were returned. Out of this number, 14 had to be dropped due to incomplete response, leaving 200 sets of usable questionnaires.

The sample had slightly more females (53%) than males (46.5%). Respondents aged between 50 to 59 years old formed the largest group (37%), followed by those aged between 40 to 49 years old (28%). Another 22% were between 60 to 69 years old. The Malays made up 38% of the sample whereas the Chinese constituted about 37.5%. The Indians and other ethnic groups made up 24.5%. About 38.5% were Muslims, followed by Buddhists (30.5 %), Hindus (17%) and Christians (11%). About 27% had primary school education, 38% had high school education followed by 23% with university



education, and 12.5% with diploma. Slightly more than one third (36%) of the respondents earned less than RM 3000 per month followed by those with monthly income of between RM 3000 to RM 4999 (30%). Respondents earning monthly income above RM7000 constituted about 18.5%.

## Measures

Chronological age was obtained by asking respondents to indicate their year of birth. Cognitive age was measured with the four indicants of feel, look, act, and interests, developed by Barak and Schiffman (1981) and validated by Wilkes (1992). Respondents were asked to identify themselves as members of self-referenced age decades (10s-80s) by responding to the four statements: "I feel as though I am in my\_\_\_\_", "I look as though I am in my\_\_\_\_", "I do most things as though I am in my\_\_\_\_", and "My interests are mostly those of a person in his/her\_\_\_\_" (Mathur and Moschis, 2005). The alpha reliability coefficient was 0.94 comparable to the alpha coefficient (0.95) of the US sample (Mathur and Moschis, 2005). The mean for chronological and cognitive age was 56.8 (SD= 10.4) and 45.8 (SD=11.8), respectively.

Life stage transitional events were measured by asking respondents to indicate those events that they had experienced in the past 12 months from a list of 10 events: marriage, divorce/separation, birth/adoption of first child, last child move out of household, marriage of an adult child, birth of first grandchild, retirement, lost job or forced to retire and spouse retiring/ending work, and death of spouse or parent. Although research on life events typically cover a wide range of events, this study has focused on those events that require a change in roles, i.e., transitional in nature. For each event that was indicated was



coded as 1, otherwise it was coded as 0. The scores were summed to obtain a 0-10 point index of life stage transitional events. The mean number of transitional life events was 0.6 (SD = 0.9).

For biological changes the measure used in this study was adopted from Mathur and Moschis (2005). Respondents were asked to indicate if they had experienced five biological/health events in the past 12 months: lengthy hospitalization or rehabilitation, hearing impairment, needing assistance in day-to-day living, diagnosis of chronic condition or illness, and eye problem that cannot be corrected with glasses. Each positive answer was coded as 1; otherwise it was coded as 0. Responses were summed to produce a 0-5 point index of biological changes. The mean number of biological changes was 0.63 (SD = .95).

To measure defensive ageing consumption activities, a list of commonly known anti-ageing products such as skin care products (lotion, cream, and sun block) health supplements that can help to prevent functional decline such as Q10 Co-enzyme, deep sea fish oil, collagen and health food (organic food and high anti-oxidant food) and anti-ageing treatments and therapies (plastic surgery and Botox and Vitamin C injections) was included. Respondents were asked to indicate if they had adopted the product. Positive response was coded as 1; otherwise it was coded as 0. All positive responses were summed to obtain the total number of products adopted. The mean number of anti-ageing products used was 1.4 (SD=1.8).

Eleven types of exercise included in the study were: aerobic exercise (e.g. walking), resistance exercise (e.g. gym workout) including strength training, and flexibility exercises such as tai-chi (a form of Chinese traditional exercise with generally slow



movement) and yoga. The respondents were asked to indicate the frequency of their exercise routine. The respondents were asked to indicate the frequency in which they engaged in these exercises, with 1 = never and 5 = very often. An index of the frequency of exercise was constructed based on respondents' response to each of these exercises. The exercise frequency for all the eleven types of exercises could range from 11-55. The mean was 19.27 (SD=4.9).

The scale of *life satisfaction* used for this study is Diener et al.'s (1985) satisfaction with life scale (SWLS) that has been used in studies that have appeared in leading journals (e.g., Wong et al. 2003). SWLS has demonstrated adequate cross-cultural conceptual equivalence, holding similar meanings across cultures (Wong, Rindfleisch and Burroughs, 2003). Based on a five point Likert-type scale (1 = strongly disagree, 5 = strongly agree), the mean score for the five-item life satisfaction scale was 16.90 (SD = 3.39). Cronbach's alpha coefficient of 0.85 indicated good reliability.

## RESULTS

The mean chronological age was 56.7 years (SD=10.43); whereas the mean for cognitive age was 45.8 years (SD=11.20). The findings were consistent with past research suggesting that people view themselves to be several years younger (Goldsmith and Heines, 1992; Lepisto, 1989; Mathur and Moschis, 2005; Underhill and Cadwell, 1983). This suggests that the validity of relationship between chronological age and cognitive age since this study was conducted in an Asian country. Hypothesis H1 concerning the positive relationship between chronological age and cognitive age was supported since Pearson correlation shows  $r = 0.805$  ( $p < .001$ ).



In this study, the age difference between chronological and cognitive age was 11 years, whereas the age difference found in Mathur and Moschis (2005) was 7.3 years. While they found age difference between chronological age and cognitive age to be positively related to chronological age, the results of this study showed no significant relationship between cognitive age and chronological age ( $r = .135$ , ns). The findings suggest that variables other than age could account for variations in cognitive age.

Pearson correlation was performed to test the hypothesized relationship between the number of biological changes and cognitive age. Pearson correlation was  $.516$  ( $p < .001$ ), providing support for H2. Similar test was performed for hypothesis H3 where  $r = .143$  ( $p < .04$ ), suggesting that the more the number of changes experienced, the higher the cognitive age. Results of this study show that the three antecedents of cognitive age, chronological age, biological changes and transitional life events, have a positive significant relationship with cognitive age, supporting H1, H2 and H3.

For testing the consequences of cognitive age on patronage of anti-ageing products and frequency of exercise, we examined H4a which hypothesized a negative relationship between cognitive age and patronage of anti-ageing products. It was supported ( $r = -.302$ ,  $p < .001$ ). Similarly, H4c that hypothesized the negative relationship between cognitive age and participation in exercise was also supported with  $r = -.386$ ,  $p < .001$ . For the relationship between chronological age and patronage of anti-ageing products (H4b) and exercise (H4d), Pearson correlation test provides support for the hypothesized negative relationship supporting H4b ( $r = -.254$ ,  $p < .001$ ) and H4d ( $r = -.303$ ,  $p < .001$ ).



H5, Pearson correlation shows support for H5 i.e., the relationship between life satisfaction and adoption of anti-ageing products ( $r = .139, p < .045$ ), and frequency of exercise ( $r = .284, p < .001$ ).

In testing H6, the sample was split into high and low education using median. We first examined the extent of adoption of anti-ageing products for the high and low education groups. The median for years of education was 12 years with  $N = 129$  for those with low education group and 71 with high education. Those with high education showed a significant higher level of adoption and frequency of exercise compared to the low group as shown in Table 1.

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Insert Table 1 about here

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Next, Pearson correlation was performed and the results showed a positive significant relationship between years of education and adoption of anti-ageing products and exercise frequency with  $r = .301 (p < .001)$  and  $r = .423 (p < .001)$ , respectively. We further tested for the moderating effect of education on the relationship between cognitive age and adoption of anti-ageing products and frequency of exercise. The procedures suggested by Baron and Kenny (1986) were followed. For the group with low education, Pearson correlation testing the relationship between education and adoption of anti-ageing products and frequency of exercise was  $r = .249 (p < .004)$  and  $r = .339 (p < .001)$ , respectively. For the high education group, the  $r$  values for the relationship was .023 (ns) for anti-ageing product adoption and .062 (ns) for frequency of exercise. Fisher Z-transformation was applied and the results showed no significant difference between the



high and low education groups with respect to adoption of anti-ageing products ( $Z=1.501$ , ns), suggesting that education did not have a moderating effect on adoption of anti-ageing products. For frequency of exercise, Z-transformation was significant ( $1.841$ ,  $p<.03$ ). This shows that education had a moderating effect on exercise.

We performed further analyses by performing a series of regression analysis to test for the predictors of cognitive age and defensive ageing consumption activities. The first regression analysis involved cognitive age as the dependent variable and the three antecedents as the predictor variables. Results showed strong  $R^2$  ( $0.658$ ,  $F=125.89$ , at  $p<.001$ ) while the standardized beta showed that the two predictor variables of cognitive age to be chronological age and biological changes with standardized beta value of  $.748$  ( $p<.001$ ) and  $.108$  ( $p<.032$ ), respectively. Transitional life event did not emerge as a predictor variable with standardized beta =  $.032$  (ns).

In the second regression analysis, we tested the predictors for defensive ageing consumption activities. First, adoption of anti-ageing products as the dependent variable was regressed with cognitive age, together with the three antecedent variables as independent variables. Regression analysis showed a low  $R^2$  ( $0.123$ ) and the model was significant with  $F = 5.443$  ( $p<.001$ ). However, none of the independent variables was a significant predictor of adoption of anti-ageing products. Next, regression analysis with frequency of exercise as the dependent variable, the  $R^2$  was  $0.23$  ( $F = 11.628$ ,  $p<.001$ ). The variables that were significant were cognitive age (standardized beta =  $-.342$ ,  $p<.002$ ), education (standardized beta =  $.323$ ,  $p<.001$ ), and the experience of transitional life events (standardized beta =  $.130$ ,  $p<.04$ ). Finally, for life satisfaction as the dependent variable, the regression model showed low  $R^2$  ( $0.102$ ,  $F = 7.414$ ,  $p<.001$ ) and



the variables with significant standardized betas were cognitive age ( $-.152, p < .004$ ) and frequency of exercise ( $.218, p < .044$ ). The negative beta showed a negative relationship between cognitive age and life satisfaction, which shows that older adults who perceived themselves to be younger have a better life satisfaction.

## DISCUSSION

The antecedents of cognitive age: biological changes, transitional life events and chronological age had a significant positive relationship with cognitive age, consistent with the findings of past research. Since the present study is a replicate of Mathur and Moschis conducted within an Asian country with results that support past research, this study has contributed to the process of scientific discovery (Mathur and Moschis, 2005). To the extent that we find cognitive age to be positively related to transitional life events, regression analysis showed that life event was not a predictor of cognitive age, further contributing to the inconclusive evidence regarding the effect of life events on cognitive age. Contrary to the findings of Mathur and Moschis, this study did not find difference in chronological and cognitive age to be related to chronological age, suggesting that chronological age has no influence on cognitive age as one grows older. Thus, a person's cognitive changes may be due to the experience of biological changes that are commonly associated with old age that signal the onset of "age".

The negative relationship between chronological age and adoption of defensive ageing consumption activities as well as between cognitive age and defensive ageing consumption activities was supported, consistent with past research (Wilkes 1992;



Mathur and Moschis 2005). Findings suggest that as people think themselves to be growing old, their behaviour towards defensive ageing consumption decline. The onslaught of the thought of being old affects individuals' interest in "keeping young", similar to the findings of Wilkes (1992) and Mathur and Moschis (2005) where they found cognitive age had a negative influence on fashion interests and entertainment activity. In summary, this study has contributed towards what we understand by old age consumer behaviour in an Asian context, which may be a manifestation of a person's old age identity development (Moschis and Mathur, 2005).

The findings of this study may be useful for marketers in their marketing strategies. Study of this nature will help to shape the marketers' approach to attract older consumers. Marketers should shift their focus away from regarding older consumers as old since older consumers tend to view themselves as several years younger than their chronological age. An understanding of how consumers perceive themselves in terms of their cognitive age is useful besides the demographics that are easy to apply. Cognitive age could also be used as a segmentation variable for products designed to protect against ageing. In particular, marketers could re-think their communication strategies when targeting the older consumers. For example, marketers of skin care products should not restrict their communication strategy to product benefits it should encompass the notion of self-concept which in turn affects the adoption of anti-ageing products.

Future research should include a wider age range and a larger sample to overcome the problem associated with a small sample size. It would be useful to include transitional events that certain age groups tend to experience as well events that occurred not only in the past 12 months but also in the more distant past since such events may have an effect



on changes in self assessment of cognitive age. In addition, it may be useful to examine stress as a mediating variable that might influence people's assessment of cognitive age. Finally, longitudinal study to capture how people's chronological age changes over time is useful, especially when it is studied alongside the occurrence of transitional life events.

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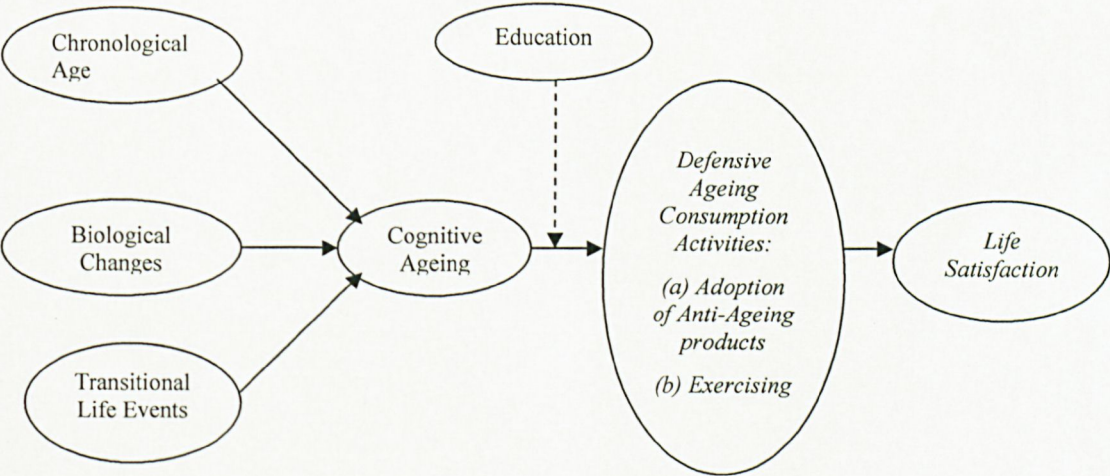
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**Figure 1: Research Framework: Defensive Ageing Consumption Activities among Older Consumers in Malaysia**



Source: Adapted from Mathur and Moschis (2005), p. 975



**Table 1: Adoption of Anti-ageing Products and Frequency of Exercise by Education**

	Education		t-test
Defensive ageing consumption activities	High (N=71) Mean (SD)	Low (N=129) Mean (SD)	Significance
Anti-ageing products	1.97 (1.7)	1.08 (1.8)	$p<.001$
Exercise	21.72 (5.3)	17.91 (4.2)	$p<.001$



# **Best Conference Paper Award**

2008 Global Marketing Conference at Shanghai

Best Paper in Marketing Asia Track

Fon Sim Ong (University of Malaya)

“THE CORRELATES OF COGNITIVE AGING AND ADOPTION  
OF ANTI-AGING PRODUCTS AMONG OLDER ADULTS”

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